

ENHANCING INSTRUCTIONAL EFFICIENCY THROUGH GENERALIZATION AND INSTRUCTIVE FEEDBACK: A SINGLE-SUBJECT STUDY WITH CHILDREN WITH MENTAL RETARDATION

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The purpose of this study was to analyze (a) the acquisition and maintenance effects of the simultaneous prompting (SP) procedure on teaching to name objects to two participants with mental retardation, (b) the effects of multiple exemplar approach for generalizing the acquired skills over three non-trained examples (sample), and (c) the effects of presenting instructive feedback stimuli on acquiring non-target information. A multiple probe design across behaviors was used and replicated across a subject in the study. The results showed that SP was effective on the acquisition and maintenance of the target behaviors by the participants in the study. The participants generalized the acquired skills to three examples with at least 91% accuracy and were able to gain instructive feedback stimuli to some extent. Future research needs are discussed based on the findings.

Children with mental retardation often have difficulty in acquiring cognitive and social skills. Hence, researchers and educators pay close attention to finding effective and efficient instructional procedures to overcome this difficulty. Although effectiveness of a procedure is ultimately important, it is not sufficient when deciding to choose the best fit procedure. Efficiency of a procedure also has a significant impact on effective teaching practices. Wolery and Gast (1990) conceptualized efficiency as (a) producing rapid learning, (b) providing more generalized performance, (c) producing broader learning, (d) providing the emergence of relationships that are not directly taught, and (e) positively influencing later learning.

One of the effective instructional procedures for individuals with mental retardation is known as simultaneous prompting (SP). SP can be defined as presenting the discriminative stimulus and immediately providing a controlling prompt during instruction. Since the teacher prompts the correct response with the discriminative stimulus in each training trial, independent student responding can not be obtained during training sessions. Therefore, following the first training session, probe sessions are needed to test the establishment and transfer of stimulus control from controlling prompt to natural stimulus (Dogan & Tekin-Iftar, 2002; Morse and Schuster, 2004; Parrott, Schuster, Collins, & Gassaway, 2000). A growing number of effectiveness studies show that SP was effective on teaching various discrete as well as chained skills to children with various disabilities with various ages (Dogan & Tekin-Iftar; Tekin-Iftar, Acar, & Kurt, 2003; Tekin-Iftar, 2003; Fickel, Schuster, & Collins, 1998; Gursel, Tekin-Iftar, & Borkurt, 2006; Morse & Schuster; Parker & Schuster, 2002; Maciag, Schuster, Collins, & Cooper, 2000; Parrott et al. 2000).

According to Wolery and Gast's conceptualization of efficiency (1990), gaining instructive feedback to some extend and obtaining high level of generalization can be considered as important benefits of an efficient procedure. Instructive feedback is extra, non-target information (i.e., stimuli) presented in the consequent events of instructional trials. Students are not asked to respond to these stimuli when presented and reinforcers are not provided if they do respond (Schuster, Morse, Griffen, & Wolery, 1996; Tekin-Iftar

et al., 2003). Review of literature shows that students usually acquire instructive feedback stimuli to some extent (e.g., Doyle, Gast, Wolery, Ault, & Meyer, 1992; Doyle, Schuster, & Meyer, 1996; Gast, Doyle, Wolery, Ault, & Baklarz, 1991; Tekin-Iftar, 2003; 2003; Werts, Wolery, Holcombe, & Frederick, 1993). However, there are only nine studies examining the acquisition of instructive feedback when using SP (Griffen, Schuster, & Morse, 1998; Gursel et al., 2006; Parker & Schuster, 2002; Parrott et al., 2000; Schuster & Griffen, 1993; Singleton, Schuster, & Ault 1995; Tekin-Iftar; Tekin-Iftar et al.; Wolery, Holcombe, Werts, & Cipollene, 1993).

It is well-documented that individuals with mental retardation have often difficulty in generalizing the acquired skills from one situation to another (Alberto & Troutman, 1995; Steere, Pancsofar, Powell, & Butterworth, 1989; Wolery, Bailey, & Sugai, 1988). Therefore, generalization from training situation to novel situation should be planned when designing instruction for individuals with mental retardation. Multiple exemplar approach is one of the generalization approaches that systematically aim generalization during the acquisition stage. Browder and Snell (1983) reported the stages of multiple exemplar approach as follow: (a) define the stimulus and response class, (b) define the sample, (c) test all examples prior to training, (d) start training with the first example of the target behavior, (e) when the criterion is reached on the first example, probe the rest of the examples, (f) stop training if generalization is reached in all examples, (g) repeat step d and e for the second example if generalization is not reached, (h) follow the above stages up until the generalization criteria are reached in all examples. The multiple exemplar approach has been used successfully to obtain or at least facilitate generalization of target discrete as well as chained skills (Collins, Gast, Wolery, Holcombe, & Leatherby, 1991; Gardill & Browder, 1995; Hughes & Rusch, 1989; Hughes, Schuster, & Nelson, 1993; Sandknop, Schuster, Wolery, & Cross, 1992; Schuster & Griffen, 1993; Smith & Schloss, 1986; Solnick & Baer, 1984; Taylor, Collins, Schuster, & Kleinert, 2002). There is only a study investigating the generalization effects of SP by using multiple exemplar approach (e.g., Schuster & Griffen).

Although there are several studies investigating whether multiple exemplar approach facilitates the generalization of the newly acquired skills, very few of the studies cited explain how to use multiple exemplar approach clearly during training (e.g., Gardill & Browder, 1995; Sprague and Horner, 1984). In most of the above studies, multiple exemplar approach has been interpreted as *providing various training items to the participants and letting them choose whichever s/he wants to use*. However, as mentioned before, providing instruction with multiple exemplar approach has to do more than using various examples during training. For instance, the trainer needs to test whether generalization occurs to the untrained examples. If generalization criteria are not met on the untrained examples, then the trainer needs to provide systematic training sessions with the untrained examples. These testing and training sessions are conducted until the generalization criteria are met on all untrained examples.

Although there are research studies recommending SP as an effective instructional procedure, there still is a need to investigate the effectiveness of SP for several reasons. First, the possible ways of increasing instructional efficiency with SP needs to be examined. Second, lack of clarity about the implementation of multiple exemplar approach in the previous studies is a research need in the area. Therefore, the present study is expected to contribute to the existing research literature on SP in terms of investigating its effectiveness on acquisition and maintenance level, the generalization effects of multiple exemplar approach used with SP, and the acquisition of instructive feedback. Least but not the last, this study is expected to contribute to the effective teaching literature by refining our current understanding about SP based on the previous research studies. Consequently, the present study was planned to answer the following research questions: (a) Will SP be effective on teaching expressively identifying various tools to children with mental retardation and maintaining the acquired skills over time? (b) Will children with mental retardation generalize the acquired skills to their non-trained multiple exemplars? (c) Will children with mental retardation acquire instructive feedback stimuli presented in the consequent events after the correct responses (i.e., functions of the tools)?

Method

Participants

Participants were two Turkish primary school students with mental retardation in Eskisehir, Turkey. The participants were attending a university unit to receive supportive training. The participants spoke Turkish

and were being instructed in Turkish. Neither of the participants had previous experience with SP. No reliable cognitive or adaptive test scores were available for both participants.

Prerequisite skills which the participants had to have were as follows: (a) auditory and visual acuity, (b) following written and verbal instructions, (c) agreeing to participate in a systematic teaching process. To test the first two skills various auditory and visual directions were presented. A written contract was voluntarily signed by the parents and researchers to ensure the third prerequisite.

Serkan was a seven year old male with mental retardation. He was attending first grade when the study was conducted. Serkan was referred to Guidance and Research Center, a local center, for diagnosis. His physical growth was the same as his typical peers. Serkan was able to perform some self-care skills, daily living skills, and communication skills appropriately. Although he was able to follow directions, he did not have literacy and numeracy skills.

Selim was an eight year old male with mental retardation. He was attending first grade for the second time. His physical growth was the same as his peers. His strengths included performing some self-care and daily living skills, and following directions. Areas of weakness included academic skills, communication skills, and articulation.

Settings

The study was conducted at the university unit where the participants were attending. An one-on-one teaching arrangement was used during all experimental sessions. There was a table, two chairs, a bookcase, and a coffee table in this classroom. During the study the participants and the teacher, third author, sat facing each other at the table. The teacher held the materials next to the participants and provided them to the participant following an unpredictable sequence. All experimental sessions were conducted by the teacher. There was an observer, the second author, to record the sessions via cam-coder. Reliability data were collected by the observer. No one was available during the experimental sessions other than the teacher and the observer. Experimental sessions refer to all probe sessions, instructive feedback sessions, training sessions, maintenance and generalization probe sessions. Two sessions were conducted per week.

Materials

During training, index cards (18 cm x 24 cm), actual tools, notepads, and reinforcers were used. Reinforcers were selected by the participants and consisted of objects such as accessories, toys, stationery items, and edibles. Naming tools was chosen as target behaviors in this study since naming these items and their functions were part of their school curriculum. The pictures of the tools were selected from clipart files and glued on the index cards. Since a multiple exemplar approach was used in the study, three sets of pictures indicating the tools in different ways and a set of actual tools with a total of four sets were used in the study. For example, three different pliers pictures were downloaded from clipart files and actual pliers were used. Three sets (two sets formed from clipart files and one set of actual tools) were used as generalization sets to test the generalization in the generalization probe sessions and one set (formed from clipart files) was used as training set. Name of the tool was written on a sticker and stuck on the back of each card as visual cues for reminding the teacher about the target stimuli (e.g., *Pliers*) and the instructive feedback (e.g., *We use pliers for twisting up and cutting off a wire.*) presented as a behavioral consequence after every correct response during training sessions. Twelve unknown tools were selected as target behaviors for each participant and three training sets of tools were formed for each participant.

Screening Procedures

Prior to initial baseline conditions, 24 tools were downloaded and printed out from clipart files. Twenty-four trials took place in each screening session and two screening sessions were conducted for each participant. Screening trials were implemented as follows: The teacher secured the participant's attention (e.g., *Are you ready to work?*), explained the rules of the screening sessions (e.g., *I am going to ask you the name of the tool on the card. If you know, please answer my question*"), held a prospective stimulus card, and asked the participant, *Tell me the name of this tool.* and waited 4 s for a response. There were two types of responses in these sessions. Correct responses were defined as the participant naming the given tool in 4 s correctly. Incorrect responses were defined as the participant naming the given tool in 4 s incorrectly or not giving any response during the response interval. No behavioral consequence was provided for either correct or incorrect responses during screening sessions. Twelve unknown tools were identified for the participants and three training sets were prepared each participant. To equalize the difficulty levels across

the training sets, a difficulty level analysis was conducted. The number of words in the name of the tool and sound similarity were taken into consideration when forming the training sets. Training sets and instructive feedback presented to each tool are presented in Table 1. After identifying the target behaviors (12 unknown tools) for each participant, multiple examples (three sets) of these tools for testing generalization were prepared.

General Procedures

Screening sessions were conducted to identify the target stimuli prior to the experimental procedures. Three tool sets consisting of 12 tools were taught to two participants. During instructional trials, the function of that specific target stimulus was presented as instructive feedback following each correct response. All experimental sessions were conducted in an one-on-one teaching arrangement and trials were presented by an unpredictable sequence. Intermittent probe sessions were conducted to test acquisition. Also, maintenance probe sessions after the training and instructive feedback sessions and generalization probe sessions after every full probe condition were conducted in the study. In all experimental conditions, responses were recorded as correct if the participant named the given tool within 4 s correctly, or incorrect if the participant did not respond or responded incorrectly. The inter-trial interval and response interval were 4 s in the study. The teacher delivered verbal reinforcement for the participants' attending and cooperation behaviors at the end of each session.

Table 1
Tool Sets and Instructive Feedback Stimuli

| Participants | Sets | Tools | Instructive Feedback Stimuli |
|--------------|------|--------------|--|
| Serkan | 1 | Rasp | We use rasp for putting the wood in order. |
| | | Pliers | We use pliers for twisting up and cutting off the wire. |
| | | Auger | We use auger for punching the wood and/or the iron. |
| | | Flat pliers | We use flat pliers for manipulating the wire. |
| | 2 | Pincers | We use pincers for pulling up the pin. |
| | | Hatchet | We use hatchet for cutting off the firewood. |
| | | Screw | We use screw for combining the parts. |
| | | Wrench | We use wrench for repairing the taps. |
| | 3 | Screwdriver | We use screwdriver for putting out or replacing the screw. |
| | | Meter | We use meter for measuring the objects. |
| | | Pocket knife | We use pocket knife for cutting off the small items. |
| | | Cutter | We use cutter for cutting the papers. |
| Selim | 1 | Rasp | We use rasp for putting the wood in order. |
| | | Pincers | We use pincers for pulling up the pin. |
| | | Auger | We use auger for punching the wood and/or the iron. |
| | | Wrench | We use wrench for repairing the taps. |
| | 2 | Screwdriver | We use screwdriver for putting out or replacing the screw. |
| | | Meter | We use meter for measuring the objects. |
| | | Screw | We use screw for combining the parts. |
| | | Flat pliers | We use flat pliers for manipulating the wire. |
| | 3 | Handsaw | We use handsaw for cutting off the wood. |
| | | Pliers | We use pliers for twisting up and cutting off the wire. |
| | | Pocket knife | We use pocket knife for cutting off the small items. |
| | | Cutter | We use cutter for cutting the papers. |

Full Probe Conditions

To ensure the experimental control, full probe sessions were conducted before introducing the intervention to the first training set and after criterion was met for each training set. All training tool sets in the first example set were probed during full probe sessions until stable data were recorded for at least three consecutive sessions. Full probe sessions were conducted as follows: The teacher had training materials ready, secured the participant's attention (e.g., *Are you ready? Today we are gonna work on naming tools. Let's start?*), explained the rules (e.g., *I am going to ask you the name of a tool. If you know, please tell the name of it.*), and then provided the target stimulus (e.g., *What is the name of this tool?*). Correct responses resulted in verbal praise; incorrect or no responses were ignored.

Intermittent Probe Sessions

Since a controlling prompt is delivered on every training trial during instruction with SP, the participant does not have an opportunity to respond to the target stimulus independently. Therefore, daily probe sessions are recommended to assess acquisition. However, it is argued in the literature that error rates during daily probe sessions is significantly higher than error rates during training sessions (Maciag et al., 2000; Tekin-Iftar, 2003). Therefore, to control the error rate, intermittent probe sessions were conducted to test for the transfer of stimulus control in SP. Moreover, a decrease in probe time was aimed as well by conducting intermittent probe sessions. Intermittent probe sessions were conducted following two training sessions in a row just before the third training session. Tool sets that were currently being taught were probed in these intermittent probe sessions. Correct responses during intermittent probe sessions were counted toward criterion. Based on the participants' performances the criterion was 80% accuracy in naming tools during intermittent probe sessions for three consecutive sessions for Serkan, and 100% accuracy in naming tools during intermittent probe sessions for three consecutive sessions for Selim. Intermittent probe sessions were implemented just like full probe sessions with the exception that in intermittent probe sessions, only the currently trained tool set was assessed.

Instructive Feedback Probe Sessions

Following the full probe condition, an instructive feedback probe session was conducted to assess the acquisition of instructive feedback. Instructive feedback probe session was conducted in the same manner with full probe session. Twelve trials took place in each instructive feedback session. Correct responses resulted in verbal descriptive praise, incorrect responses were ignored, and the next trial was presented.

Simultaneous Prompting Procedure

Simultaneous prompting was delivered during instruction to teach naming tools. After getting stable data from the first full probe condition, SP was introduced to teach the first training set. Instructive feedback stimuli were presented during SP instruction after obtaining a correct response from the participants. Two training sessions were delivered per a week. There were four tools in every single training set and three trials were presented to each tool with a total of twelve trials in each session. Responses during instruction with SP were recorded as correct, incorrect, and no response. The response definitions were same as the response definitions of the probe sessions. Training sessions were conducted as follows: The teacher had materials ready, explained the rules (e.g., *I am going to ask you the name of a tool on the card. Please, listen to me carefully and repeat the name after I tell you.*) secured the participant's attention by receiving an affirmative response to the question, *Serkan, ready for work?*, the teacher showed the card and presented the task direction, *Serkan, please tell me, what is the name of this tool?*, and then provided the controlling prompt, *This is pliers*, immediately and waited 4 s for a response. If the participant imitated the controlling prompt and repeated it within 4 s, the teacher verbally praised the participant's response and then provided the instructive feedback *Perfect, Serkan. These are pliers. We use pliers for twisting up and cutting off a wire.* Incorrect responses or no responses within 4 s resulted in ignoring. Then the teacher presented the next trial.

Maintenance and Generalization Probe Sessions

Maintenance probe sessions were conducted one, two and four weeks after training. The response definitions in maintenance and generalization probe sessions were the same as in the full probe sessions. The same behavioral consequences were provided in these sessions.

A multiple exemplar approach was used to facilitate the generalization of the acquired skills in the study. Therefore, generalization probe sessions were conducted after every single full probe condition to test generalization. In these sessions, three examples of the tools (i.e., two index cards and one actual tool) in each training set were probed respectively. In other words, the multiple examples of the tools that had not directly been taught during training sessions were probed in these sessions. When the participants met the generalization criteria for the first example set, the second example set was probed and so forth. However, if the participant did not meet the criteria on the first example set, training with the first example set was planned. Criterion was at least 80% generalizing accuracy of the acquired tool name during generalization probe sessions for Serkan, and 100% generalizing accuracy of the acquired tool name during generalization probe sessions for Selim. However, since both participants met the generalization at or above criteria, there was no need to start training with multiple examples of any set.

Experimental Design

A multiple probe design across training sets and replicated across a participant was used to assess the effectiveness of SP on teaching naming tools. Effectiveness of the SP was built in when the participant was performing at or near to baseline levels during full probe conditions before the intervention had been introduced and the criterion was reached only after the intervention was introduced (Tekin-Iftar & Kircaali-Iftar, 2006; Wolery et al., 1988).

Inter-observer and Procedural Reliability

Reliability data were collected during at least 25% of the experimental sessions. Dependent variable reliability was calculated by using the point by point method with a formula of the number of agreements divided by the number of agreements plus disagreements multiplied by 100 (Tawney & Gast, 1984). Dependent variable reliability data indicated 98% (range = 97-99) agreement across the experimental sessions for Serkan and 100% agreement during all experimental sessions for Selim.

Independent variable reliability (procedural reliability) data were collected to estimate whether the teacher delivered SP and other experimental sessions (e.g., full and intermittent probe session and generalization sessions) as they were planned in the study. Independent variable reliability was calculated by dividing the number of observed teacher behaviors by the number of planned teacher behaviors, and multiplied by 100 (Billingsley, White, & Munson, 1980). Generally, percentages of the teacher's compliance with the planned steps in all experimental sessions for both participants were consistently high. The teacher delivered full probe, training, generalization, and instructive feedback probe sessions with 100% compliance with the planned steps of the sessions with both participants. The teacher delivered intermittent probe and maintenance sessions with 99% (range = 97%-100%) compliance with the planned steps with Serkan and with 100% compliance with the planned steps of these sessions with Selim.

Results

Instructional Data

Figure 1 and 2 depict the intermittent probe and training sessions' data for Serkan and Selim. As seen at Figure 1 and 2, both Serkan and Selim met criteria after the introduction of SP. Hence, the data indicate that SP was effective on teaching and maintaining expressively identifying the tools. Moreover, it should also be noted that no procedural modification was needed during the experimental sessions. The number of training sessions and trials, training and intermittent probe time, and training and intermittent probe errors are presented in Table 2.

As can be seen in Figure 1 and 2 maintenance data collected one, two, and four weeks after the final full probe session showed that participants maintained the acquired training sets at criterion level. Serkan maintained the acquired sets with an average of 86% (range = 67-100) accuracy across all three sets and Selim maintained the acquired sets with an average of 97% (range = 92-100) accuracy across all three sets.

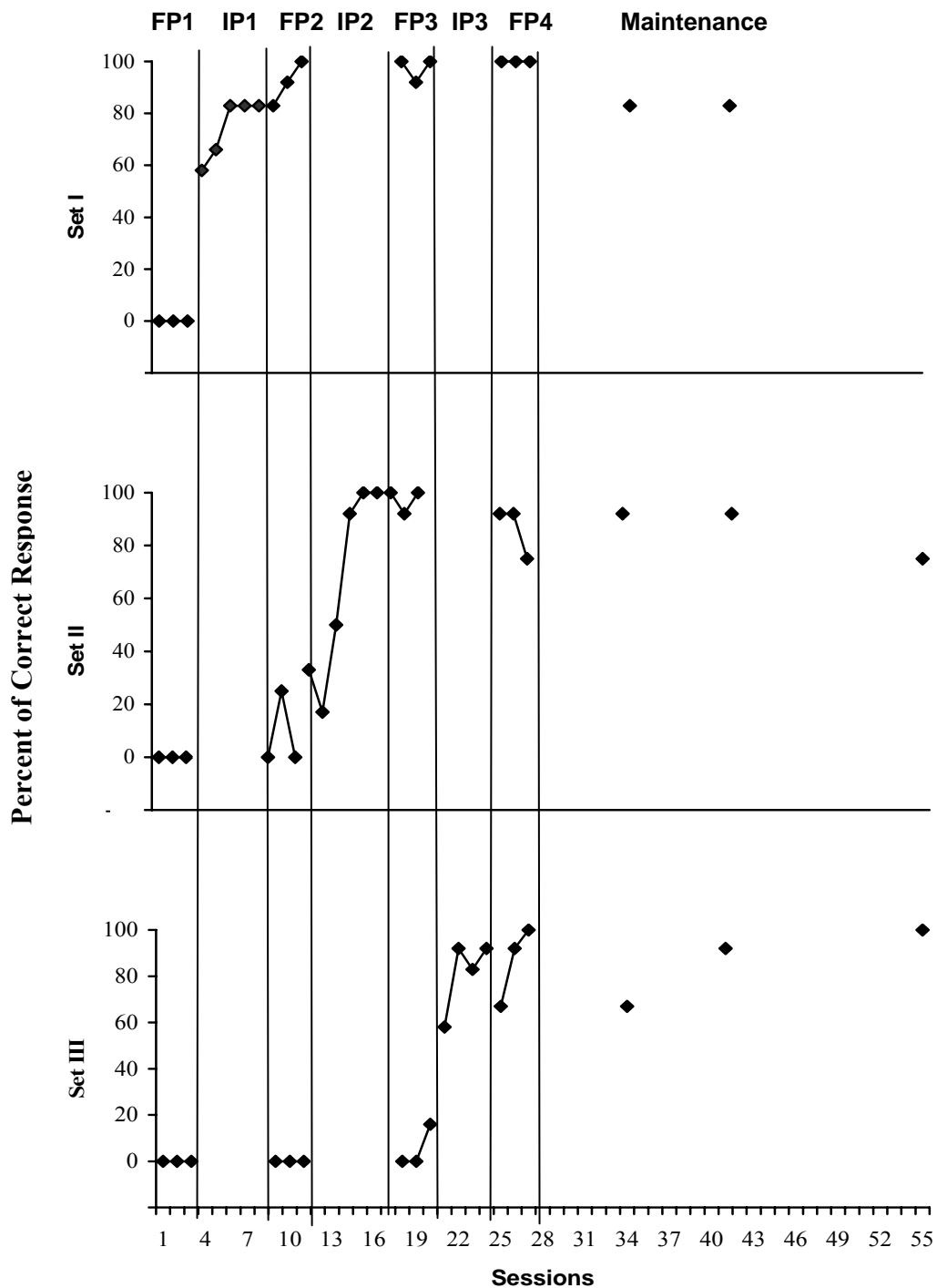


Figure 1.
Percent of correct responses for Serkan during intermittent probe, full probe, and maintenance probe data. Intermittent probe data were plotted in the training conditions.

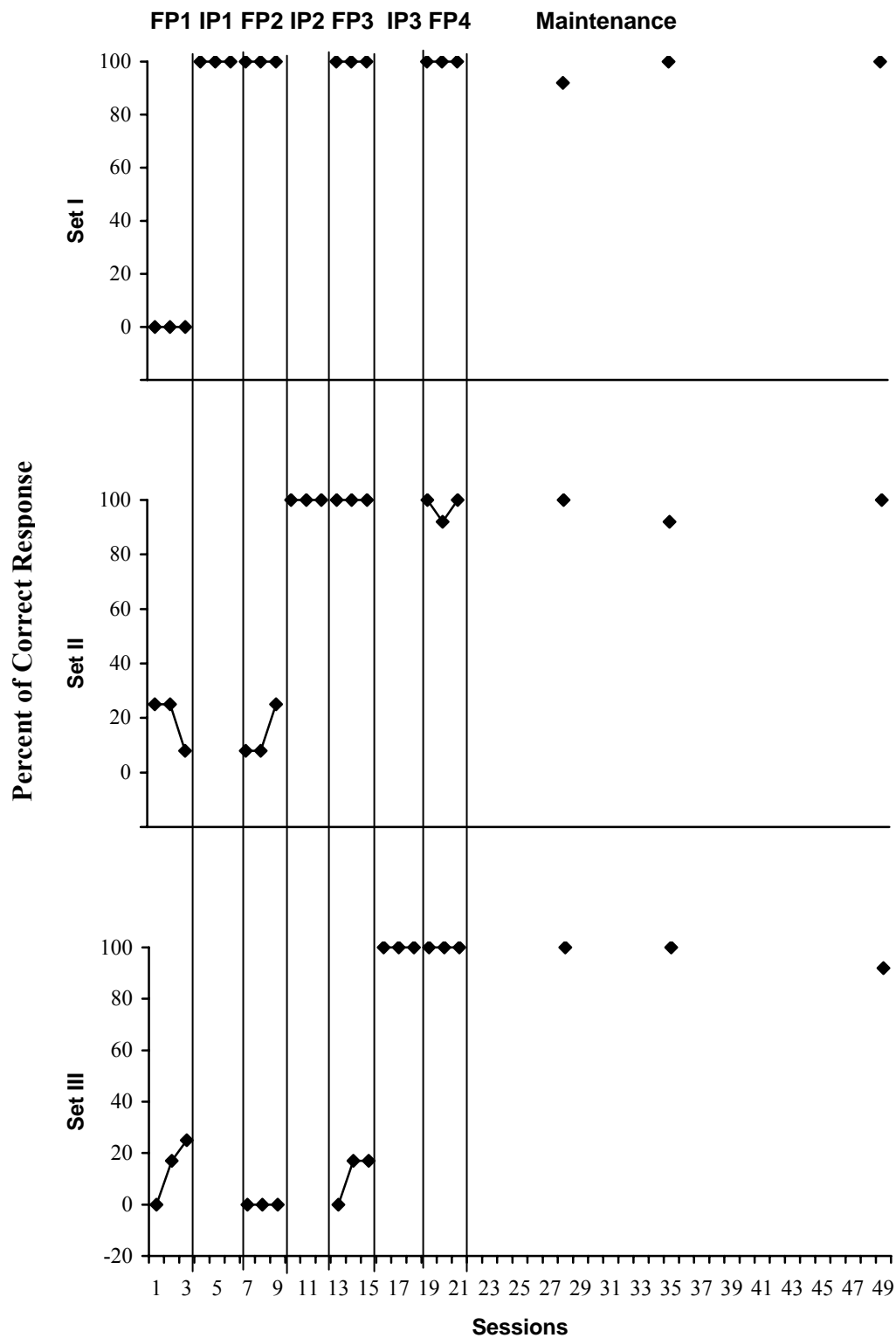


Figure 2.
Percent of correct responses for Selim during intermittent probe, full probe, and maintenance probe data. Intermittent probe data were plotted in the training conditions.

Table 2
Instructional Data for Each Participant and Training Set Through Criterion

| Participants | Training sets | No. of training sessions and trials | No. and % of training errors | Training time (h:min:s) | Intermittent probe time (h:min:s) | No. and % of intermittent probe errors |
|--------------|---------------|-------------------------------------|------------------------------|-------------------------|-----------------------------------|--|
| Serkan | 1 | 10/120 | 2/2% | 00:22:53 | 00:07:44 | 15/25% |
| | 2 | 14/168 | 0/0% | 00:32:00 | 00:13:11 | 25/35% |
| | 3 | 8/96 | 0/0% | 00:16:59 | 00:16:12 | 5/10% |
| Total | Across sets | 32/384 | | 01:11:52 | 00:26:57 | 45/23% |
| Selim | 1 | 6/72 | 0/0% | 00:15:13 | 00:05:59 | 0/0% |
| | 2 | 6/72 | 0/0% | 00:15:16 | 00:04:29 | 0/0% |
| | 3 | 6/72 | 0/0% | 00:12:58 | 00:03:30 | 0/0% |
| Total | Across sets | 18/216 | | 00:43:27 | 00:13:58 | |
| Grand total | | 50/600 | 2/3 | 01:55:19 | 00:40:55 | 45/7.5% |

Generalization Data

Generalization across multiple exemplars data showed that both participants generalized the acquired training sets at or above criterion level. Therefore, no generalization training sessions was conducted for none of the participants during the study. Table 3 shows the findings regarding generalization.

Table 3
Accuracy of Generalization of the Acquired Skills to Their Multiple Examples During Full Probe Sessions

| Participants | Sets | Baseline (Full Probe I) | Full Probe II | Full Probe III | Full Probe IV |
|--------------|-------------|-------------------------|---------------|----------------|---------------|
| Serkan | 1 | 0% | 92% | 100% | 100% |
| | 2 | 0% | 0% | 100% | 100% |
| | 3 | 8% | 0% | 25% | 100% |
| Total | Across sets | 3% | 31% | 75% | 100% |
| Selim | 1 | 0% | 100% | 100% | 100% |
| | 2 | 25% | 25% | 100% | 100% |
| | 3 | 25% | 50% | 75% | 100% |
| Total | Across sets | 17% | 58% | 92% | 100% |

Instructive Feedback Data

Data collected for the acquisition of instructive feedback stimuli indicate that each participant acquired some of his own instructive feedback stimuli. The mean percentage of correct responding on instructive feedback stimuli for each training set for both participants during baseline, full probe, and maintenance sessions are presented in Table 4

Table 4
Accuracy of Responding to Instructive Feedback Stimuli During Full Probe Sessions

| Participants | Sets | Baseline (Full Probe I) | Full Probe II | Full Probe III | Full Probe IV |
|--------------|-------------|-------------------------|---------------|----------------|---------------|
| Serkan | 1 | 25% | 75% | 75% | 75% |
| | 2 | 25% | 25% | 75% | 75% |
| | 3 | 25% | 25% | 58% | 100% |
| Total | Across sets | 25% | 42% | 75% | 83% |
| Selim | 1 | 0% | 75% | 75% | 75% |
| | 2 | 25% | 25% | 0% | 50% |
| | 3 | 25% | 50% | 50% | 50% |
| Total | Across sets | 17% | 50% | 42% | 58% |

While Serkan responded with 25% accuracy to the instructive feedback stimuli across three sets during baseline sessions, he responded with 83% accuracy (range = 75-100) to the instructive feedback stimuli after the final probe sessions. Selim responded with 17% accuracy (range = 0-25) to the instructive feedback stimuli across three sets during baseline sessions, he responded with 58% accuracy (range = 50-75) to the instructive feedback stimuli after the final probe sessions.

Discussion

The purpose of this study was to evaluate the effects of SP for teaching discrete skills to two participants with mental retardation. In addition, acquisition of instructive feedback stimuli, and maintenance and generalization effects via multiple exemplar approach were also examined. Based on the data collected, the following findings can be stated.

First, data indicate that SP was effective on the acquisition and maintenance of the target discrete behaviors. These findings were similar with the findings of previous studies (Dogan & Tekin-Iftar, 2002; Fickel et al., 1998; Griffen et al., 1998; Singleton et al., 1995; Tekin-Iftar, 2003; Tekin-Iftar et al., 2003; Wolery et al., 1993; Morse and Schuster, 2004). Therefore, it can be argued that the findings of the present study extend the body of research with SP.

Second, generalization data showed that participants were able to generalize the acquired skills to their multiple exemplars with at least 91% accuracy. As mentioned before, three types of examples for each target behavior were prepared. The findings showed that SP was effective on generalizing the acquired skills with high accuracy during acquisition. This observation provides evidence that SP is also an efficient instructional procedure that facilitates generalization during acquisition.

Third, it was clearly seen that participants gained the instructive feedback stimuli presented to them on the consequent events during instructional trials to a certain extent. This finding indicates that SP promotes broader learning during instruction. Participants gained the instructive feedback stimuli with 50% to 100% accuracy in the study. The study contributed to the existing research literature about SP with instructive feedback.

Although the findings of the study are positive and encouraging in general, some findings of the study are worthy of discussion. First, the present study was conducted with only two participants and a single discrete skill was aimed to teach in the study. Working with more participants would have strengthened the generalization of the findings and external validity of the study.

Second, the reinforcers were started to be faded out during maintenance probe sessions in the study. This can be responsible for obtaining lower performance during maintenance sessions. In order to prevent the lower performance, the reinforcers could have been faded out as soon as the criteria were met during training sessions.

Third, a pool-out instructional format was used in the study in order to strengthen the experimental control. A pool-in instructional format or small group instructional format in natural settings could have been employed in the present study.

Fourth, although intermittent probe sessions were conducted to decrease the number of errors during probe sessions, the number of incorrect responses was still high, 23% with one of the participants, Serkan. This finding reminds the researchers that investigating the characteristics of the participants (e.g., comparing the participant who has experience with systematic instruction with the one who does not) would be planned instead of investigating the effects of the frequency of the probe session.

Fifth, there is a significant increase in Selim's generalization probe data on the training sets (i.e., Set 2 and Set 3) which had not been taught (see Table 3). The same data pattern was seen in the same training sets in the same participant's instructive feedback data (see Table 4). The possible reasons of these increases can be explained in a way that Selim understood the process and was able to interpret the relationship between trained and untrained sets.

Sixth, the maintenance data for the generalization of the acquired skills and instructive feedback stimuli were not collected and analyzed in the study due to the summer break. This can be considered as another limitation of the study.

Although there are several limitations and discussion points in the study, the study has some strengths as well. First, positive effects of the factors that promote the efficiency of instruction were observed in the study. Gaining the acquisition of some of the instructive feedback stimuli was realized to a certain extent in the study. This finding lets the researchers argue that SP promotes or at least facilitates the acquisition of instructive feedback. Therefore, it can be argued that SP has positive effects on promoting broader learning and/or future learning. Second, the generalization data in the present study showed that participants met the criteria. Therefore,

generalization training via multiple exemplar approach was not implemented in the study. However, it would not be wrong to argue that SP provides or at least facilitates generalization in the acquisition level. Therefore, it can be argued that SP has positive effects on the generalization of the acquired skills.

Third, the procedural reliability was found to be very high in the present study (i.e., ranging from 95.5% to 99.2% across participants). The procedural reliability findings were usually high in the previous studies as well. Therefore, the present study supports the previous studies in this perspective. High procedural reliability data obtained in most of the SP studies show us that SP is an easy to implement, teacher-friendly instructional procedure. Therefore, the utilization of SP during systematic instruction can be recommended to special education teachers, teacher aides, peers, family members, and other care-givers.

The implementation of the steps of the multiple exemplar approach is provided clearly in the present study. Therefore, providing a model for the future research in terms of explaining implementation of the steps of the multiple exemplar approach can be argued as another strength of this study. Since, when the use of multiple exemplar approach is a case in the study it is understood that various training items are provided to the trainees and they have the right of selecting the one that they would like. On the other hand, multiple exemplar approach was taken into consideration systematically and a six-step implementation was planned in the present study. The implementation of these steps was explained in the study clearly. Therefore, it could not be wrong to argue that this study would be a model when deciding to facilitate generalization through multiple exemplar approach.

Based on the findings, limitations, and strengths of the present study the following recommendations can be provided to the teachers and other practitioners. First, teachers and other practitioners can be recommended to implement similar procedure in a group format or pull-in strategy in inclusive settings with participants with different disabilities. Second, as mentioned before, the reinforcement was thinned in the maintenance probe sessions in the study. Future researchers may design a study comparing the effects of reducing the reinforcement on the acquisition and maintenance level. Third, designing intermittent probe sessions did not decrease the error rate in the present study. Therefore, future researchers can be recommended to design studies to compare the differential effects of student characteristics (e.g., having the experience of receiving systematic instruction or not). Fourth, future researchers can also be recommended to examine the maintenance effects of acquired instructive feedback stimuli and generalization effects through multiple exemplar approach. Lastly, future researchers can determine higher criteria (it was 80% in the present study) for generalization when implementing the steps of multiple exemplar approach of this study.

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